

The “Return” Planes in the Light Track on Planes Nos. 7 and 8 in the 1856-1859 Configuration
of the D&H Gravity Railroad

By S. Robert Powell

Rollin Manville was the constructing engineer of the 1856-1859 configuration of the D&H Gravity Railroad. Here is what was built at that time under his direction.

Eight entirely new, double-tracked planes were built from Carbondale to the top of the Moosic Mountain at Farview. The foot of Plane No. 1 was in the same location as in 1829 and 1845, but Plane No. 1 now went up the mountain on what is named Dickson Avenue at present. Planes Nos. 2 and 3 went up the ravine to the Artesian Well area and crossed the ravine to the north. Heading north and then east in a broad sweeping curve up the mountain were Planes 4, 5, 6, and 7 (which was behind No. 7 Pond).

Loaded Cars on Plane No. 8: Plane No. 8 was on the summit of the mountain. The track for loaded cars from the head of Plane No. 8 (2,000 feet above tidewater) to the head of Plane No. 9 (the first of the three downhill planes from Farview to Waymart) was the Summit Level, which was 4,895 feet long. There were at this time three double-tracked planes (with one track for loaded cars and one track for light cars) down from Farview to Waymart, Nos. 9, 10, and 11.

The Ten-mile level remained as in 1845: single tracked, loaded cars only. Planes Nos. 13- 17: single tracked, empty cars only, same as in 1845. Between 1848 and 1868, the water wheels on Planes 14, 15, 16, and 17 were all replaced with stationary steam engines.

Once back at Waymart, the empties were raised up Planes 11, 10, and 9. At the head of Plane No. 9, the empties were moved onto the light track on Plane No. 8.

In 1859, all of the planes and levels between Carbondale and Honesdale, except Planes Nos. 13- 17 and the Ten-mile level, were double-tracked, with both tracks, except on Planes 7 and 8, located side by side on the same roadbed.

Loaded and Light Tracks on Planes No. 8 and 7 Were Separated: On Plane 8 (1859), the loaded car track and the light car track were separated from each other (on different roadbeds) on this Plane. Why was this done?

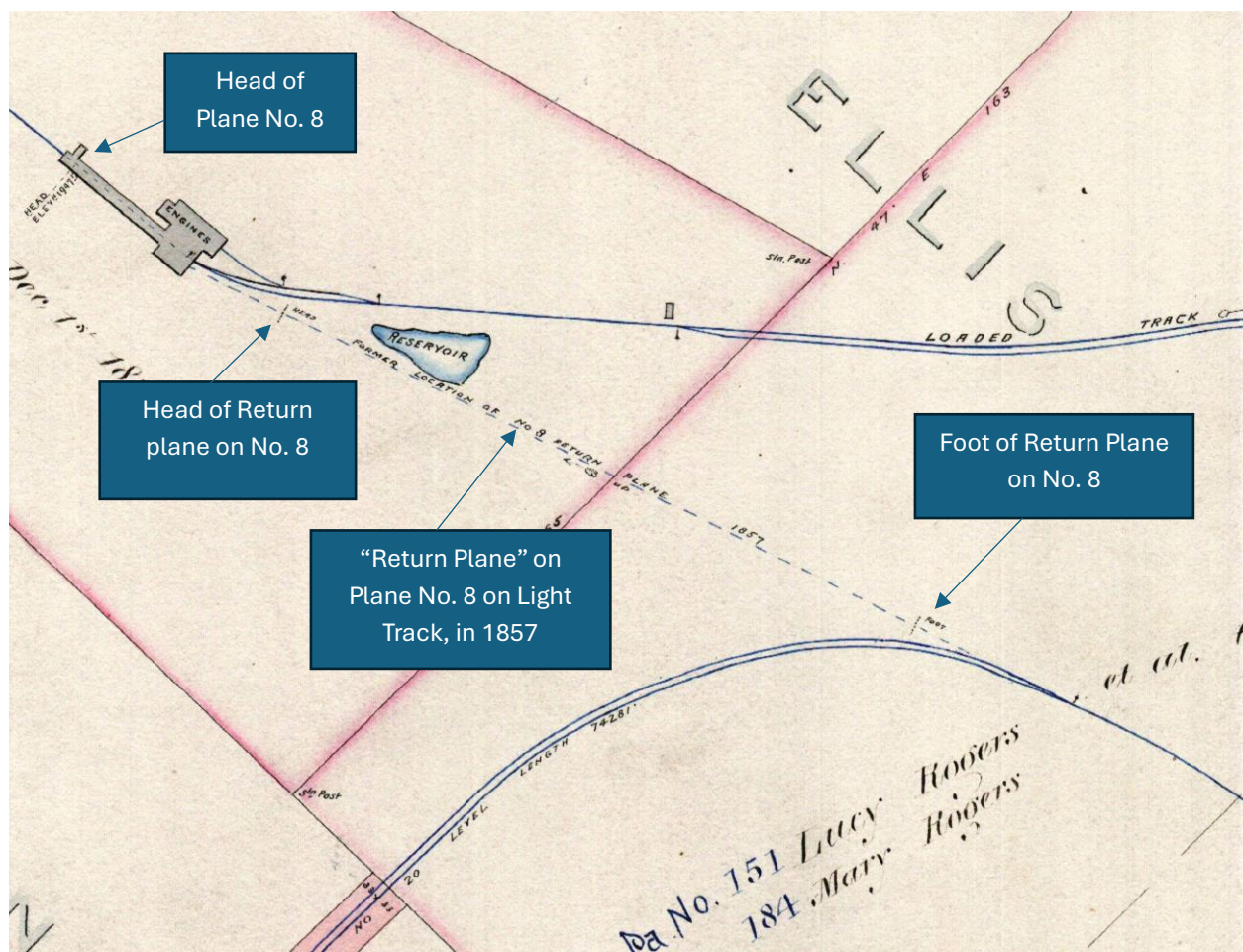
In 1845, it will be recalled, the loaded and the light tracks on Planes Nos. 1-6 were both on the same roadbed, with the six loaded tracks graded so that the loaded cars descended from the head of one plane to the foot of the next by gravity (horses no longer needed on these loaded levels). In 1845, the light car tracks, however, were not graded to the West, which meant that horses were still needed to move the empty cars East to West.

In 1859, all of the loaded car tracks were, as in 1845, still graded to the East, but now (1859) the light car tracks on Planes 6, 5, 4, 3, 2, and 1 were graded to the West, which meant that the empty cars now moved down those tracks by gravity and that horses were no longer needed on those tracks. What about the light car tracks on Planes Nos. 7 and 8?

Light Cars on Planes Nos. 8 and 7: To move the empty cars, East-West, on the top of the Moosic Mountain in 1859 (from the head of Plane No. 9 to the head of Plane No. 7), the light car tracks on Plane No. 8 and Plane No. 7 were graded so that the light cars moved to the west by gravity. [to a point about halfway down the length of the light track.]

Given the topography of the Moosic Mountain in the area through which the light cars on Plane No. 8 had to pass on their way to the head of Plane No. 8, there came a point, about halfway down the level, when the westward movement of the empty cars on the light track of No. 8 came to an end. At that point, the cars were pulled up a “return plane” (in Level No. 8) that took the empty cars to the head of Plane No. 8.

Map detail showing the “return plane” on Plane No. 8, Light Track:



Given the topography of the Moosic Mountain in the area through which the light cars on Plane No. 7 had to pass on their way to the head of Plane No. 7, there came a point, about halfway down the level, when the westward movement of the empty cars on the light track of No. 7 came to an end. At that point, the cars were pulled up a “return plane” (in Level No. 7) that took the empty cars to the head of Plane No. 7. Once the empty cars reached the head of Plane No. 7, they were then moved down the mountain on the light car tracks on Planes Nos. 6, 5, 4, 3, 2, and 1.

As a result of those changes in the tracks on Planes Nos. 1-8 at this time (1859), horses were no longer needed on the light tracks of the Gravity Railroad to move the cars. Horses were used, however, right up to the closing of the Gravity line at the end of the nineteenth century, like switcher engines, to move cars at the foot of Plane No. 1 and Plane No. 13.

The Transformation of the Light Car Tracks on Planes No. 8 and No. 7 in 1856-1858 into Level No. 20 in 1868: Given the fact that the westward movement, by gravity, of the empty cars on the “light” track on both Plane No. 8 and Plane No. 7 came to an end before those empty cars reached the head of Planes No. 8 and No. 7, respectively, a return plane had to be inserted in the light track on both of those planes in order to raise the empty cars uphill to the engine house, first on Plane No. 8, and then on Plane No. 7 (so that the empty cars could be sent down the mountain via the light tracks on Planes Nos. 6, 5, 4, 3, 2, and 1), we can deduce that the terrain through which the light car tracks on Plane No. 8 and Plane No. 7 passed sloped not only upgrade / to the north (against the force of gravity in this location), but also to the West.

About these two return planes, we read the following in *Century of Progress* (p. 154): “A material enlargement in the capacity of the railroad was commenced in 1856, the Managers authorizing, on February 15, alterations and improvements ‘west of plane No. 6.’ Accordingly, a new road between Carbondale and the summit was constructed on a new location, and the number of planes was increased from five to eight. Six of the new planes and the intervening levels were double-tracked. The other two planes [Nos. 8 and 7] were also double-tracked, but on this section new tracks for light cars were constructed on descending grades to the foot of ‘return planes’ by which they were elevated to the head of the next plane. [emphasis added] These improvements were completed early in 1858.” (One cannot help but wonder: Were these two return planes a feature of the 1859 configuration of the Gravity Railroad that were discovered during the construction of the line, or were they a solution to a problem that emerged after the 1859 configuration of the Gravity Railroad opened?)

These are the only two instances in the entire D&H Gravity system, it is important to note, where empty cars on the light track of a Gravity Railroad plane did not descend, by gravity, the entire length of the light track on a Gravity Railroad plane. Was this a design flaw in Rollin Manville’s design for the 1859 configuration? Was it necessary to have the head of Plane No. 8 at 2,000 feet above tidewater in order to make it possible for loaded coal cars and passenger vehicles to descend by gravity, 4,895 feet, from the head of Plane No. 8 to the foot of Plane No. 8? If the foot of Plane No. 8 had been somewhat higher, would the empty cars on the light track on Planes No. 8 and 7 have been able to travel to the head of Planes Nos. 8 and 7 by gravity (without the return planes)?

[John Jervis, who designed the 1829 configuration of the Gravity Railroad, and James Archbald, who designed the 1845 configuration of the Gravity Railroad were both still living when the 1859 configuration of the Gravity Railroad opened, and Jervis and Archbald, both brilliant engineers, if they ever studied/contemplated the Gravity Railroad that was designed and built in 1859 under the

direction of Rollin Manville, it seems safe to conclude, would have been shocked/appalled to learn that forward movement of cars on the light track on Plane No. 8 and Plane No. 7 was prevented because those cars had to confront head-on the force of gravity.]

D&H management and engineers, following the opening of the 1859 configuration of Gravity Railroad (with the highly inefficient and labor-intensive light tracks, on Plane No. 8 and Plane No. 7, and their reliance on the loaded track to function effectively) surely and quickly must have realized that “the light track problem on Planes No. 8 and No. 7” had to be corrected. In correcting that problem they worked *with* gravity, *not against* gravity. How did they correct that problem?

To do so, in 1868, seven years after the 1859 configuration of the line was opened, a new track for empty cars from the top of the mountain down to Carbondale, a distance of six miles of continuous descent, was opened. On that new track, the forward motion of the cars was in response to gravity, and with the light and loaded tracks completely separated from each other. (In the Lackawanna Valley, from Archbald south to Olyphant, the loaded and light tracks on the Gravity Railroad were completely separated/detached for each other beginning in 1859.) With the new light track in place on the Moosic Mountain, remarkably, two ascending and eight descending planes on that mountain were eliminated. This work was continued through 1867 and completed in the following year, the new track being opened for the movement of light cars on April 21, 1868.

That new track, which was created to solve the light track problem on Planes No. 8 and No. 7, was Level No. 20, which was one of the greatest engineering successes of the D&H in the nineteenth century.

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